

AMENDMENTS TO THE SPECIFICATION

Page 1, Line 2, delete this paragraph, namely "Description"

Page 1, Line 4, before this line insert the following paragraph heading:

FIELD AND BACKGROUND OF THE INVENTION

Page 1, please replace the paragraph beginning at line 4 with the following rewritten paragraph:

The invention is based on a hydraulic transformer which has, ~~according to the preamble of patent claim 1,~~ a housing and an expeller part in which a plurality of expellers, which bound expeller spaces with variable volumes, are guided[[,]]. The transformer includes a cam part on which the expellers are supported, and control means, in particular a control cam with three kidney-shaped control slots via which the expeller spaces can be successively connected to a supply port, to a working port, and to a reservoir tank port.

Page 1, please replace the paragraph beginning at line 23 with the following rewritten paragraph and one paragraph heading:

WO 97/31 185 A1 discloses a hydraulic transformer with an axial piston design in which the hydraulic motor and hydraulic pump are integrated one in the other and which has a swash plate, a rotatably mounted drum with the axial pistons, and a control cam with three kidney-shaped control slots whose relative position with respect to the dead center positions of the axial pistons can be varied by rotating the control cam with respect to the swash plate. Such a hydraulic transformer is extremely complicated to regulate.

SUMMARY OF THE INVENTION

Page 2, please replace the four consecutive paragraphs beginning at line 11 with the following four consecutive rewritten paragraphs:

The aimed-at objective is achieved according to the invention by means of a hydraulic transformer ~~which has the features of the preamble of patent claim 1~~ and in which ~~in addition~~ the control means can be controlled cyclically, ~~in accordance with the characterizing part of patent claim 1~~ and in which, in particular, a control cam or the expeller part can be driven in rotation by means of a drive. Of the two components comprising the expeller part and cam part, one component can move freely with respect to the other component in terms of two rotational or translatory degrees of freedom within a limited range. ~~According to patent claim 2, the~~ The control means can preferably be controlled cyclically, in particular one of the control cams can be driven in rotation by means of a drive, and

of the two components comprising the expeller part and cam element, one component is arranged essentially fixedly with respect to the housing and the other component can move freely in terms of two rotational or translatory degrees of freedom within a limited range.

Further advantageous embodiments of a hydraulic transformer according to the invention are disclosed hereinafter.
~~can be found in the further subclaims~~

~~According to patent claim 3, t~~ The limits of the range within which the other component can move freely are variable. The hydraulic transformer can ~~then~~ be set to a large swept volume if the secondary-side hydraulic actuator is to be moved at high speed. At low speed, the swept volume is made small so that the control means can be operated with short cycle times, and the pulsations in the streams of fluid are low. Static friction between the components which bear one against the other and are moved in relation to one another is less apparent than in the case of slow movements. The stream of fluid to the hydraulic actuator can be metered better.

~~According to patent claim 4, t~~ The cam element in a hydraulic transformer with an axial piston design is preferably a wobble plate which is mounted by means of a universal joint with its center in the center of said wobble plate so as to be capable of pivoting on all sides and can be supported, at a distance from its center, on a stop in a rotational fashion. The hydraulic transformer has a high dynamic level since the wobbling movement produces only low moments of inertia. On the one hand, in comparison with a hydraulic transformer with a rotatably mounted swash plate, the moved mass can be kept small, and on the other hand the moment of inertia of a circular disk about its central

axis is twice as large as the moment of inertia with respect to an axis of symmetry in the disk plane. The axial forces of the drive mechanism can easily be absorbed hydrostatically since there is no need for a mechanical shaft bearing with seal.

Page 4, please replace the nine consecutive paragraphs beginning at line 18 with the following nine consecutive rewritten paragraphs and one paragraph heading:

~~According to patent claim 7, t~~ The distance between the center and the rotating support point of the wobble plate is equal to or larger than the distance between the center and the locations where the axial pistons act on the wobble plate. The contact force with respect to the force exerted by the axial pistons is then stepped down. If the distance is the same, the one dead center position during the movement of the axial pistons does not change when the oblique position of the wobble plate changes and the length of the bores in which the axial pistons are located can be very small.

In one hydraulic transformer ~~according to patent claim 12,~~ the distance between the universal joint and the stop measured in the direction of the central axis of the expeller part is variable. Given distances of different sizes, the oblique setting of the wobble plate, and thus the geometric swept volume of the hydraulic transformer, is different.

If the universal joint has a fixed position on a central axis of the hydraulic transformer, the rolling circle radius of the wobble plate on a support face is smaller than the rolling circle radius on the wobble plate. However, the rolling

circle path on the support face is then shorter than on the wobble plate. When the wobble plate moves, compensation can then be carried out between the different lengths of the rolling circle paths by virtue of the fact that the wobble plate either also makes a rotational movement in addition to its wobbling movement or also slides with respect to the support face, at the rolling point. Sliding would mean increased wear at the punctual or linear contact point between the wobble plate and stop part. A rotational compensating movement of the wobble plate requires the expeller part to be rotatable about the central axis, if the joints between the wobble plate and the axial pistons are fixed with respect to the wobble plate.

A compensating movement of the universal joint is preferably permitted. For this purpose, ~~according to patent claim 13~~ the universal joint can be moved in the center of the wobble plate on a circular path about a central axis of the expeller part, and the stop is of shell-shaped design in order to absorb axial and radial forces.

A further possibility is, ~~according to patent claim 14,~~ for the universal joint to be arranged fixedly on the central axis, and for a sliding element which bears against the stop in a plane perpendicular to the central axis and which is connected to the wobble plate by means of a joint whose position rotates with the wobble plate, to be arranged between the stop and the wobble plate. Of course, a planar sliding movement takes place between the sliding element and the stop. The wear which is caused by this is however low owing to the planar abutment between the wobble plate and stop.

A simple design for permitting the wobble plate to pivot on all sides and the oblique setting of the wobble plate to

be varied is obtained if, ~~according to patent claim 15,~~ the wobble plate is embodied as a spherical layer which contains a large circle and which is located so as to slide in a sealed fashion in a circular-cylindrical receptacle and is supported in the direction of the expeller part, and if a hydraulic cushion, whose volume is variable, is located on the side of the wobble plate facing away from the expeller part.

~~According to patent claims 16 and 17,~~ The diameter of a universal joint, which is embodied as a ball and socket joint~~[[,]]~~ for the wobble plate, can also made so large that the spherical bearing faces are located on the outside of the wobble plate, that is to say the wobble plate is in its entirety the positive part of the universal joint.

~~If, according to patent claim 18,~~ the expeller part can be driven in rotation by means of a drive, the control cam can be arranged fixed to the housing so that the kidney-shaped control slots can be connected to the external ports without rotational connections.

~~Patent claims 19 to 21, contain~~Further advantageous embodiments of a hydraulic transformer according to the invention with a vane design, and ~~patent claims 22 and 23 contain~~ ~~advantageous embodiments~~ of a hydraulic transformer according to the invention with a radial piston design are also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

Page 8, please replace the paragraph beginning at line 1 with the following rewritten paragraph:

figure 2 shows an exemplary embodiment with an axial piston design, in which the wobble plate is supported on its edge on the expeller part and the oblique setting of the wobble plate can be adjusted by displacing the universal joint[[]].

Page 11, line 8, before this line insert the following paragraph heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT